

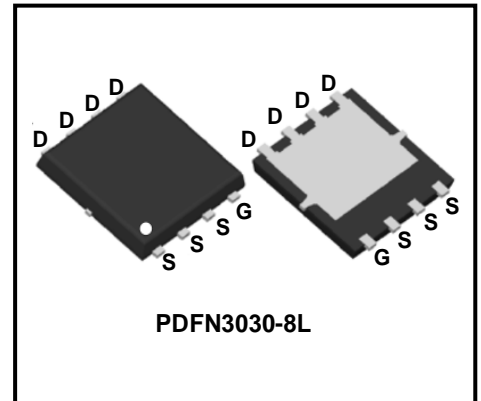
30V N-Channel Enhancement Mode Power MOSFET

Description

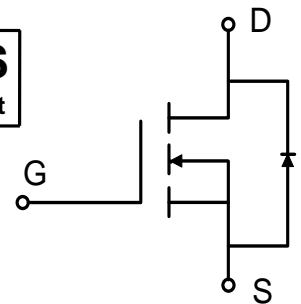
WMQ40N03T1 uses advanced power trench technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

Features

- $V_{DS} = 30V$, $I_D = 40A$
 $R_{DS(on)} < 5.5m\Omega @ V_{GS} = 10V$
 $R_{DS(on)} < 9.0m\Omega @ V_{GS} = 4.5V$
- Green Device Available
- Low Gate Charge
- Advanced High Cell Density Trench Technology
- 100% EAS Guaranteed



RoHS
compliant



Applications

- Power Management Switches
- DC/DC Converter

Absolute Maximum Ratings (Tc = 25°C, unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	$T_C = 25^\circ C$	40
		$T_C = 100^\circ C$	20
Pulsed Drain Current ⁴	I_{DM}	140	A
Single Pulse Avalanche Energy ³	EAS	61	mJ
Total Power Dissipation	$T_C = 25^\circ C$	P_D	59
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient ¹	$R_{\theta JA}$	62	$^\circ C/W$
Thermal Resistance from Junction-to-Case	$R_{\theta JC}$	2.1	$^\circ C/W$

Electrical Characteristics (Tc = 25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Static Characteristics							
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	30	-	-	V	
Gate-body Leakage current	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA	
Zero Gate Voltage Drain Current	$T_J=25^\circ C$	I_{DSS}	$V_{DS} = 30V, V_{GS} = 0V$	-	-	1	μA
	$T_J=55^\circ C$			-	-	5	
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.2	1.7	2.5	V	
Drain-Source On-Resistance ²	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	-	4.8	5.5	m Ω	
		$V_{GS} = 4.5V, I_D = 10A$	-	6.1	9.0		
Forward Transconductance ²	g_{fs}	$V_{DS}=5V, I_D=30A$	-	43	-	S	
Dynamic Characteristics							
Input Capacitance	C_{iss}	$V_{DS} = 15V, V_{GS} = 0V, f = 1MHz$	-	1895	-	pF	
Output Capacitance	C_{oss}		-	267	-		
Reverse Transfer Capacitance	C_{rss}		-	192	-		
Switching Characteristics							
Gate Resistance	R_g	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$	-	2.0	-	Ω	
Total Gate Charge	Q_g	$V_{GS} = 4.5V, V_{DS} = 15V, I_D = 15A$	-	20	-	nC	
Gate-Source Charge	Q_{gs}		-	7.6	-		
Gate-Drain Charge	Q_{gd}		-	7.2	-		
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DD} = 15V, R_G = 3.3\Omega, I_D = 15A$	-	7.8	-	ns	
Rise Time	t_r		-	15	-		
Turn-Off Delay Time	$t_{d(off)}$		-	37.3	-		
Fall Time	t_f		-	10.6	-		
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ²	V_{SD}	$I_S = 1A, V_{GS} = 0V$	-	-	1	V	
Continuous Source Current ^{1,5}	I_S	$V_G=V_D=0V$, Force Current	-	-	40	A	
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 20A, di/dt = 100A/\mu s$	-	14	-	ns	
Body Diode Reverse Recovery Charge	Q_{rr}		-	5	-	nC	

Note :

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. The EAS data shows Max. rating. The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=35A$
4. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}=150^\circ C$.
5. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

Typical Characteristics

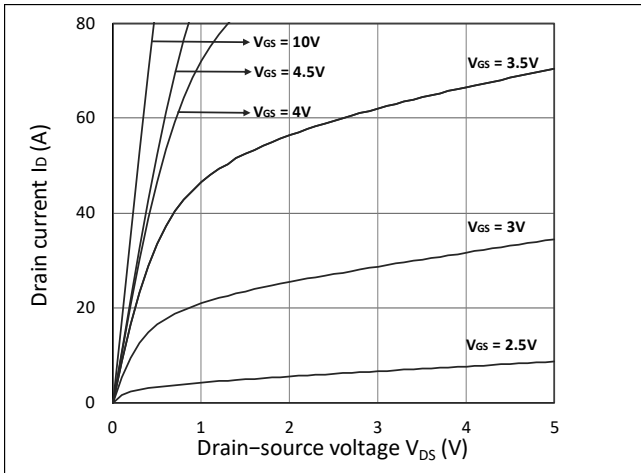


Figure 1. Output Characteristics

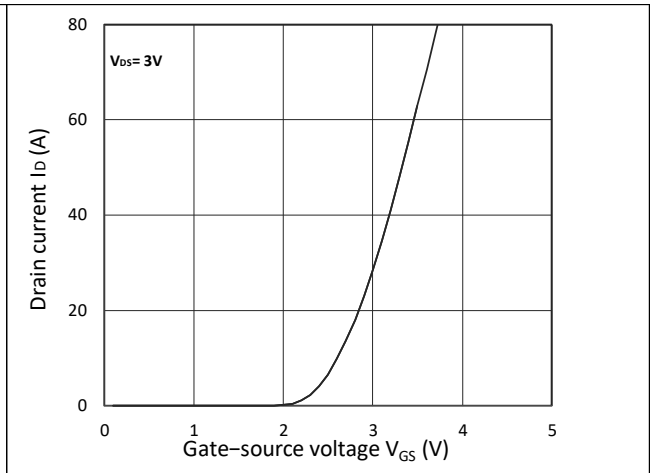


Figure 2. Transfer Characteristics

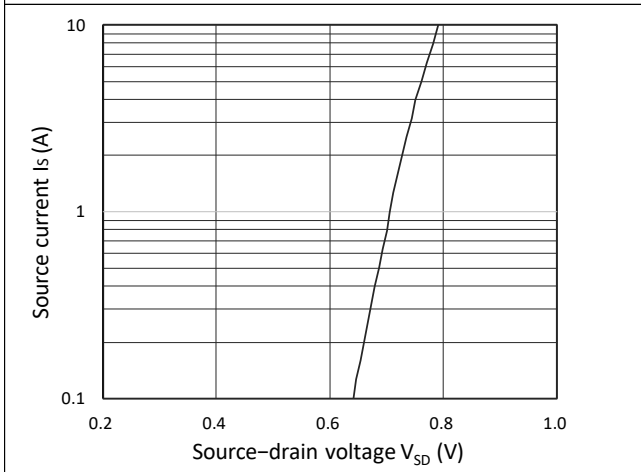


Figure 3. Forward Characteristics of Reverse

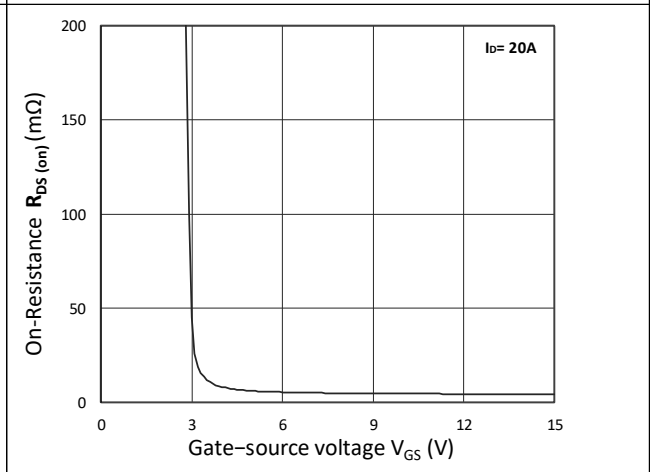


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

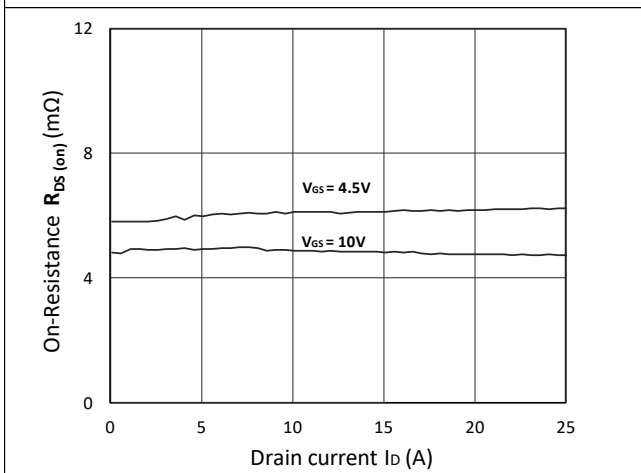


Figure 5. $R_{DS(ON)}$ vs. I_D

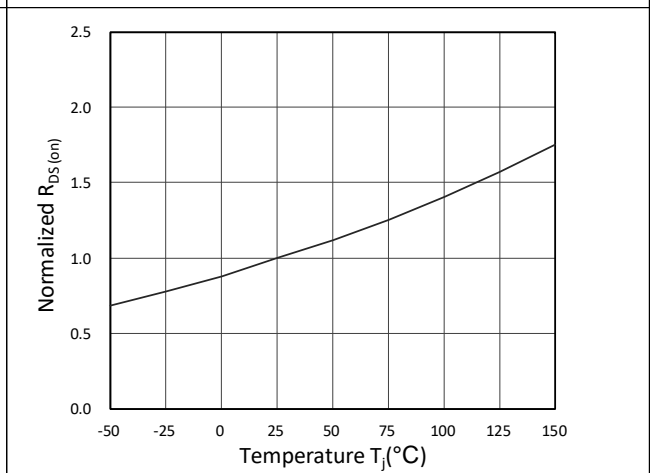


Figure 6. Normalized $R_{DS(ON)}$ vs. Temperature

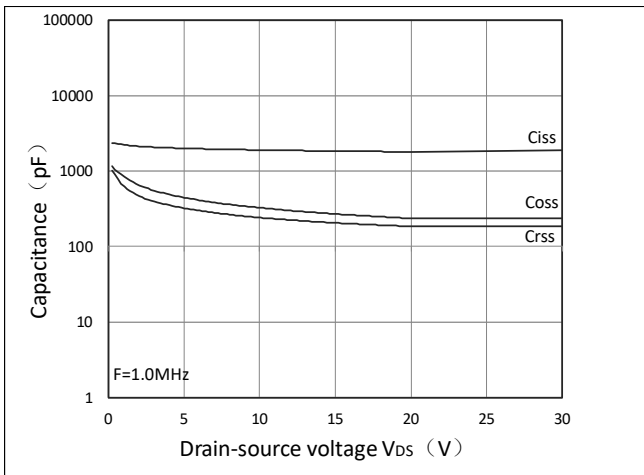


Figure 7. Capacitance Characteristics

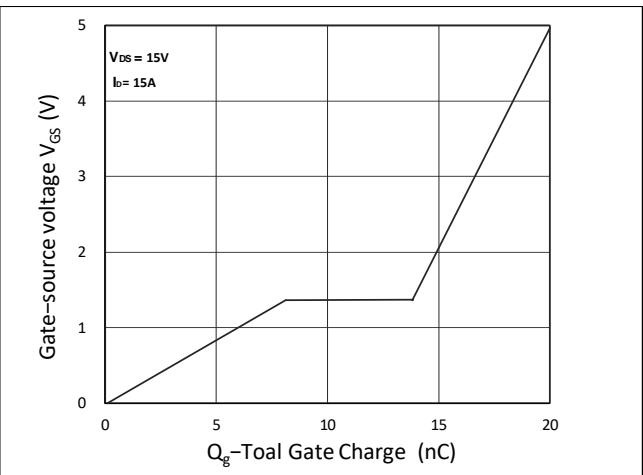


Figure 8. Gate Charge Characteristics

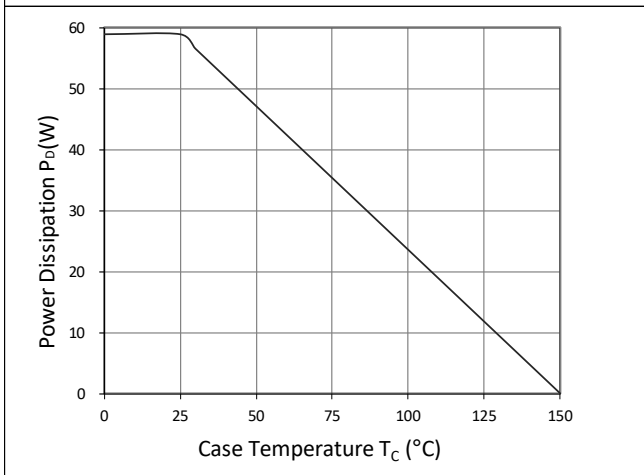


Figure 9. Power Dissipation

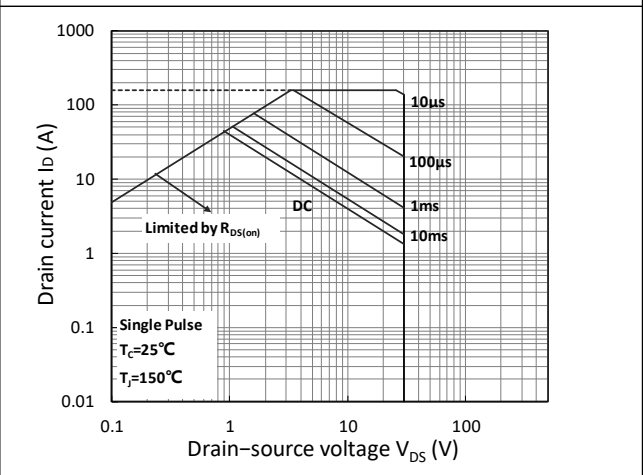


Figure 10. Safe Operating Area

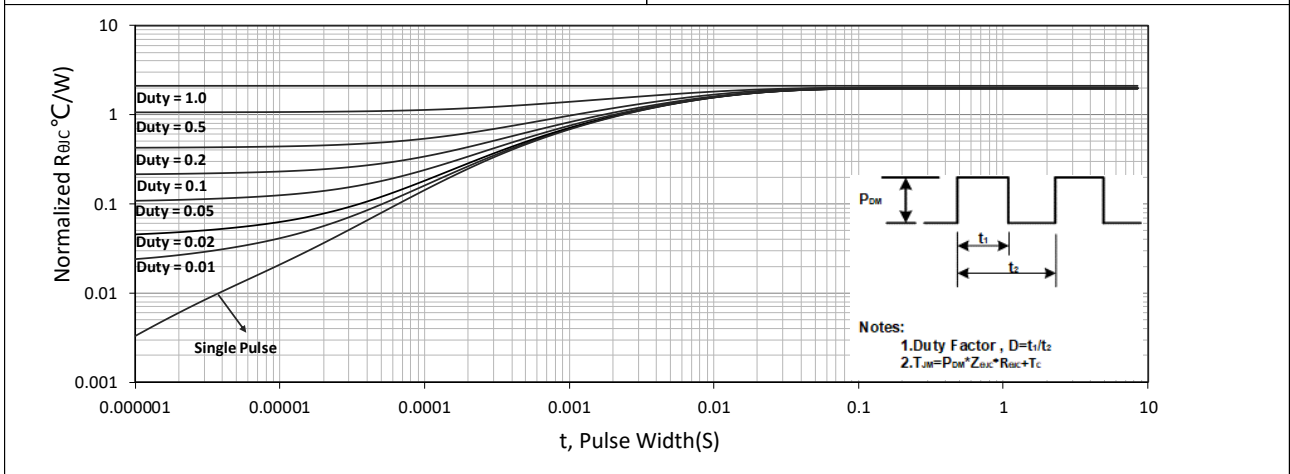


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

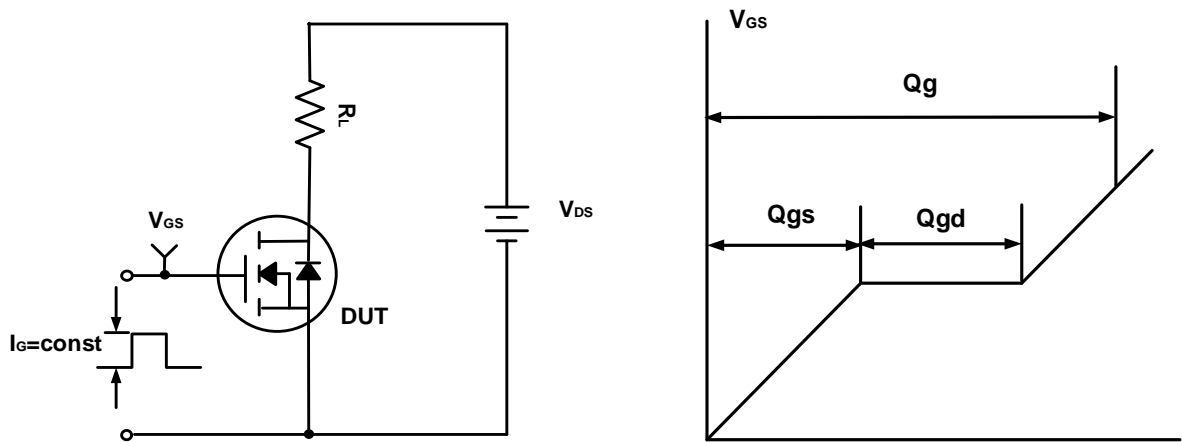


Figure A. Gate Charge Test Circuit & Waveforms

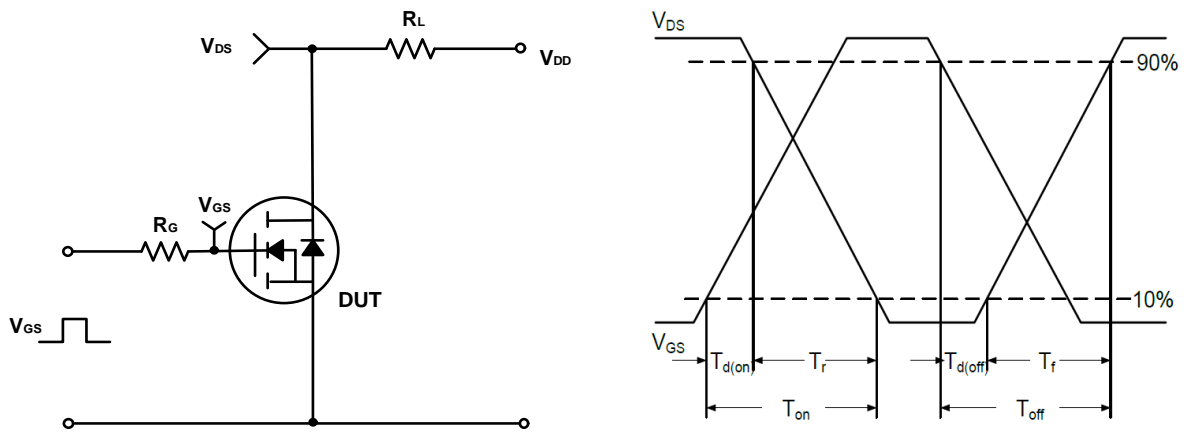


Figure B. Switching Test Circuit & Waveforms

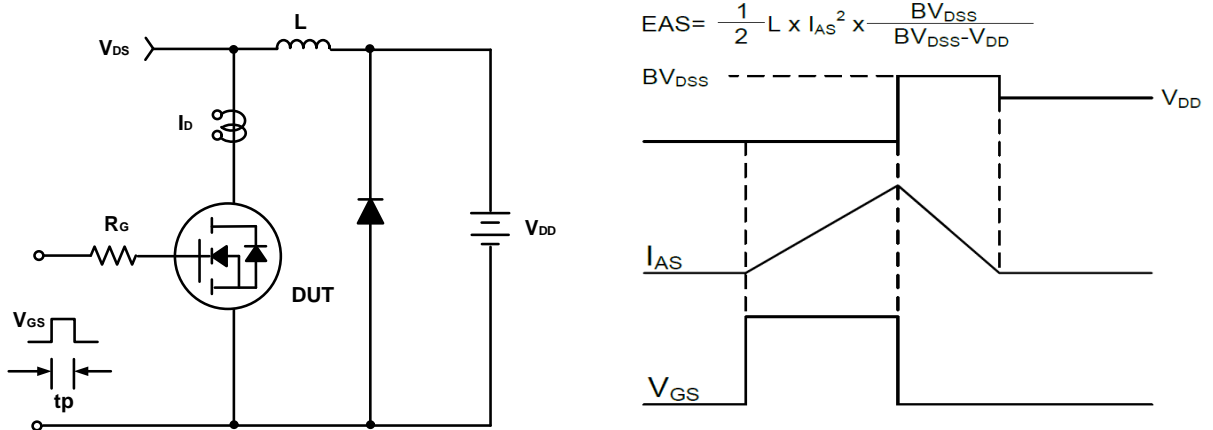
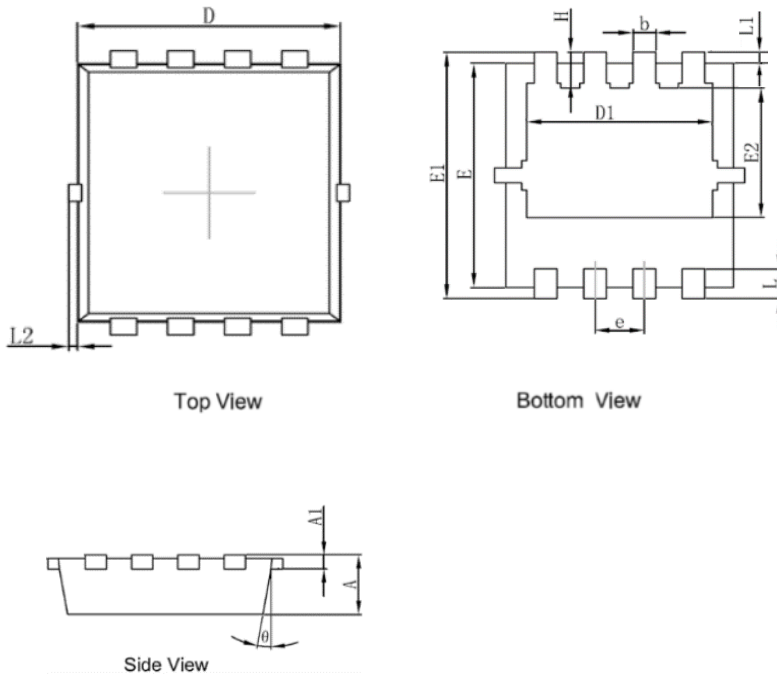


Figure C. Unclamped Inductive Switching Circuit & Waveforms

Mechanical Dimensions for PDFN3030-8L

COMMON DIMENSIONS

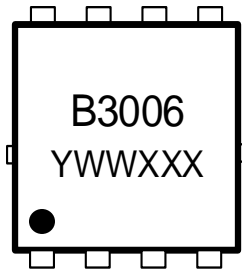


SYMBOL	MM	
	MIN	MAX
A	0.65	0.90
A1	0.10	0.25
D	2.90	3.25
D1	2.25	2.69
E	2.90	3.20
E1	3.00	3.60
E2	1.35	2.20
b	0.20	0.40
e	0.65BSC	
L	0.15	0.50
L1	0.13BSC	
L2	0.00	0.20
H	0.15	0.65
θ	0°	14°

Ordering Information

Part	Package	Marking	Packing method
WMQ40N03T1	PDFN3030-8L	B3006	Tape and Reel

Marking Information



B3006 = Device code
YWWXXX= Date code


Contact Information

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